

Phytobezoar: an uncommon cause of small bowel obstruction

E M Chisholm ChM FRCS

Visiting Lecturer

H T Leong FRCSEd

Medical Officer

S C S Chung MD FRCSEd MRCP(UK)

Senior Lecturer

A K C Li MD FRCS FRACS FACS

Professor

Department of Surgery, Prince of Wales Hospital, The Chinese University of Hong Kong, Hong Kong

Key words: Phytobezoar; Small bowel obstruction; Ulcer surgery

Phytobezoars are an unusual cause of small bowel obstruction. We report 13 patients presenting with 16 episodes of small bowel obstruction from phytobezoars. Eleven patients had previously undergone surgery for peptic ulceration (eight truncal vagotomy and pyloroplasty). A history of ingestion of persimmon fruit was common and the majority of cases presented in the autumn when this fruit is in season. One phytobezoar causing obstruction at the third part of the duodenum was removed by endoscopic fragmentation, while an episode of jejunal obstruction was precipitated by endoscopic fragmentation of a gastric bezoar. Twelve patients underwent surgery for obstruction on 15 occasions, with milking of the phytobezoar to the caecum performed in ten, enterotomy and removal in four and resection in one patient. Associated gastric phytobezoars were found in two cases and multiple small bowel bezoars in two other cases. These were removed to prevent recurrent obstruction. Phytobezoar should be considered preoperatively as a cause of obstruction in patients with previous ulcer surgery. Wherever possible milking of a phytobezoar to the caecum should be performed. Careful assessment for other phytobezoars should be made. Prevention of phytobezoars is dependent upon dietary counselling of patients by surgeons after gastric resection or vagotomy and drainage for peptic ulcer.

A phytobezoar is a concretion composed of vegetable matter such as skins, seeds and the fibres of fruit and vegetables. They have been known to exist in the stomach and intestines of animals for centuries but it was not until 1854 that Swain made the first post-mortem diagnosis of phytobezoar in man (1). The majority of series in the early twentieth century reported many gastric phytobezoars, presenting with dyspepsia,

abdominal distension or gastrointestinal haemorrhage, but small bowel phytobezoars appeared to be uncommon (5%) (1,2). Following Siefert's original observation (3), it became clear that phytobezoars were more commonly found in patients after ulcer surgery, either gastrectomy (4) or truncal vagotomy and bypass (5). Although phytobezoar was noted to cause small bowel obstruction, it was an uncommon cause, being responsible in 2.9% of all small bowel obstructions in one series (6). We present our experience with this unusual but important form of small bowel obstruction.

Patients

A total of 13 patients presented to the Department of Surgery at Prince of Wales Hospital over a 3-year period (October 1987 to October 1990). There were seven men and six women with a median age of 64 years (range 44–79 years). Eleven patients had previously undergone ulcer surgery—eight truncal vagotomy with pyloroplasty and three partial gastrectomy—with a median interval after surgery of 8 years (range 1–15 years). Three patients experienced a second episode of bezoar-related small bowel obstruction giving a total of 16 obstructive episodes.

Results

Clinical presentation

Ten patients presented with symptoms, signs and radiological evidence of small bowel obstruction. One patient with epigastric pain, vomiting and intermittent abdominal distension was thought by her general practitioner to have recurrent ulceration and a barium meal radiograph

was performed. This showed a phytobezoar causing an obstruction at the mid-ileal level. Two patients experienced epigastric pain, vomiting and succussion splash, ie features consistent with gastric outlet obstruction. Endoscopy after Salem-sump nasogastric lavage revealed a large gastric phytobezoar in one and a phytobezoar obstructing the third part of the duodenum in the other. In five patients, when asked directly there was a history of ingestion of persimmon, grapefruit or dried plums. Seven patients presented in the months of September or October when persimmons are in season in Hong Kong.

Management

The two patients with the gastric and duodenal bezoars were managed initially by non-operative endoscopic fragmentation. Successful fragmentation of the duodenal phytobezoar was achieved using a colonoscope, the extra length of the colonoscope facilitating the negotiation of all the duodenal bends. This patient made an uneventful recovery. The second patient had a large gastric phytobezoar, during the fragmentation of which a large fragment was lost through the pyloroplasty. Unfortunately, this patient developed a full-blown high small bowel obstructive picture requiring surgical intervention.

Laparotomy was required on 15 occasions. After the diagnosis was confirmed, the bezoar was milked into the caecum in 10 instances, removed through an enterotomy in four cases, and small bowel resection performed in another patient. At the time of laparotomy two patients had associated gastric bezoars. One could be broken up and milked to the caecum and for the other a gastrotomy was required for the removal of the phytobezoar. In nine cases the bezoars were ileal, four jejunal, and in two patients multiple small bowel bezoars were found.

Discussion

The word 'bezoar' derives from either the Arabic term 'badzehr' or the Persian word 'padzahr' both of which denote counter-poison or antidote. This word was applied to a greenish, hard concretion found in the fourth stomach of the Syrian goat. The stone was felt to prevent poisoning and came to Europe as the bezoar-stone which was highly prized for its medicinal properties (1,2).

Phytobezoars are composed of vegetable matter non-digestible by man and contain cellulose, hemicellulose, lignin and fruit tannins. The commonest phytobezoar encountered worldwide is related to the ingestion of the persimmon fruit (7). Izumi *et al.* (8) proposed that the formation of persimmon bezoars was due to a soluble tannin termed 'Shibuol', which forms a coagulum when the astringent unripe fruit comes into contact with dilute hydrochloric acid in the stomach. This may explain why most phytobezoars encountered nowadays are in patients who have previously undergone peptic ulcer surgery (3-7). By reducing acid secretion, interfering with the pyloric control of gastric emptying, or preventing mixing

of food by either resection or bypass of the antrum, phytobezoars may be produced. By adding a pyloroplasty or gastrojejunostomy then a larger and less digested fruit bolus may be deposited into the duodenum or jejunum to form the nucleus of the phytobezoar. In our series, 11 of 13 individuals (85%) had undergone previous ulcer surgery, eight having had truncal vagotomy and pyloroplasty.

Similar frequencies were noted in other series, where Krausz *et al.* (7) and Vellar *et al.* (6) noted all 69 of 103 patients and 9 of 9 patients had undergone previous truncal vagotomy and pyloroplasty respectively.

Krausz *et al.* (7) have reported a huge increase in the incidence of phytobezoar obstruction in Israel, related to the increasing availability and popularity of the persimmon fruit. These authors also note a seasonal relationship of small bowel obstruction and the harvest of the persimmon. It was the presentation of three cases of phytobezoar small bowel obstruction in the space of 1 month that prompted our retrospective review. In Hong Kong, the mid-autumn festival is celebrated in October. During this festival persimmons are traditionally ingested. Thus, over the past 3 years, two-thirds of our cases have presented around this festival period.

There were two patients in our series with multiple small bowel bezoars, and in a further two patients synchronous gastric bezoars were present. DeBakey and Oschner (2) reported an incidence of 4.4% small bowel bezoars and 17.5% synchronous gastric bezoars, while Krausz *et al.* (7) noted 21% associated gastric bezoars with concurrent small bowel obstruction. In a number of reports (2,6,7,9), synchronous cases of gastric phytobezoars or other small bowel bezoars missed at the initial laparotomy have subsequently produced further small bowel obstruction within a few days to a few weeks of the initial operation. It has been our practice where the diagnosis has been suspected to perform preoperative gastroscopy to identify the presence of an associated gastric bezoar. If found it can be fragmented and removed at that time. This approach has been strongly advocated by others (6,7) since the adequate examination of the stomach may be difficult due to adhesions from previous surgery. When the diagnosis has been found unexpectedly at laparotomy it is our practice to extend the incision to access the stomach. Where possible we would try to milk the phytobezoar down to the caecum without the need for gastrotomy or enterotomy. We have no need to use intraoperative endoscopy as proposed to obviate the necessity for extensive dissection of adhesions around the stomach.

McKechnie (10) first described the successful endoscopic removal of a gastric bezoar. It has been our practice to fragment gastric phytobezoars endoscopically and then to retrieve the fragments. The disruption and removal of the phytobezoar obstructing the third part of the duodenum using a colonoscope was an extension of this principle. Not all endoscopic manipulations of gastric and duodenal phytobezoars are so simple, as witnessed by our own patient developing small bowel obstruction from a large fragment slipping down to the

jejunum. Vellar *et al.* (6), Krausz *et al.* (7) and Kilan and Cohen (11) have shared similar experiences.

To summarise, small bowel obstruction from a phytobezoar is uncommon and often overlooked. Any patient having undergone previous ulcer surgery presenting with small bowel obstruction should raise the suspicion of this diagnosis. Once suspected, endoscopy during the pre-operative preparation of the patient is recommended to identify any associated gastric bezoar. This will prevent the necessity of exploring the supracolic compartment at laparotomy. If the diagnosis is made only at laparotomy, we recommend milking the phytobezoar down to the caecum with careful examination of the remaining small bowel for further bezoars, and making every effort to identify a gastric bezoar. If found, the gastric bezoar should be milked down to the caecum or removed by gastrotomy.

Finally, it behoves the surgeon to counsel patients who have undergone partial gastrectomy or truncal vagotomy and drainage to avoid the ingestion of persimmons, the pith of oranges and grapefruit and the skin of grapes and tomatoes. This would help to reduce the incidence of phytobezoars.

References

- 1 DeBakey M, Oschner A. Bezoars and concretions. *Surgery* 1938;4:934–63.
- 2 DeBakey M, Oschner A. Bezoars and concretions. *Surgery* 1938;5:132–60.
- 3 Seifert E. Ueber Krautileus. *Dtsch Z F Chir.* 1930;224: 96–8.
- 4 Schlang HA, McHenry LE. Obstruction of the small bowel by orange in the post gastrectomy patient. *Ann Surg* 1964;159:611–22.
- 5 Moseley RV. Pyloric obstruction by a phytobezoar following a pyloroplasty and vagotomy. *Arch Surg* 1967;94:290–1.
- 6 Vellar DJ, Veller ID, Pucius R, Steedmon PK. Phytobezoars—an overlooked cause of small bowel obstruction following vagotomy and drainage operations for duodenal ulcer. *Aust N Z J Surg* 1986;56:635–8.
- 7 Krausz MM, Moriel EZ, Ayalon A, Pode D, Durst AL. Surgical aspects of gastrointestinal persimmon phytobezoar treatment. *Am J Surg* 1986;152:526–30.
- 8 Izumi S, Isioa K, Iwamoto M. The mechanism of the formation of phytobezoars with special reference to the persimmon ball. *Jpn J Med Sci Biochem* 1933;2:21–35.
- 9 Kaplan O. Persimmon phytobezoars as a cause of intestinal obstruction. Pitfalls in their surgical management. *Br J Surg* 1985;72:242–3.
- 10 McKechnie JC. Gastroscopic removal of a phytobezoar. *Gastroenterology* 1972;62:1047–51.
- 11 Kilan SK, Cohen MM. Small bowel obstruction after conservative treatment of gastric bezoar. *Can J Surg* 1986;29:369, 371.

Received 5 December 1991

Notes on books

Women at High Risk to Breast Cancer edited by Basil A Stoll. 133 pages. Kluwer Academic Publishers, Dordrecht. 1991. £32.00. ISBN 0 89838 416 8

A book that provides an authoritative and balanced survey of the latest research into the genetic, familial, hormonal, reproductive, nutritional, racial and geographic factors which are associated with increased predisposition to breast cancer.

Pancreatic Disease: Progress and Prospects edited by C D Johnson and C W Imrie. 380 pages, illustrated. Springer-Verlag, London. 1991. DM146. ISBN 3 540 19688 9

Thirty-one chapters contributed by an international authorship cover in up-to-date and detailed fashion all aspects of pancreatic disease. Obstructive jaundice, carcinoma, surgical techniques, chronic pancreatitis, acute pancreatitis and transplantation are all included, together with a section on pancreatic disease in children. A useful review volume.

Contemporary Issues in Chronic Pain Management edited by Winston C V Parris. 311 pages, illustrated. Kluwer Academic Publishers, Boston. 1991. £76.25. ISBN 0 7923 1182 5

Nineteen chapters on various aspects of chronic pain management highlighting the contributions of psychology and behavioural medicine as well as anaesthetic techniques.

Organ Transplantation 1990 edited by G M Abouna, M S A Kuma, R and A G White. 582 pages, illustrated. Kluwer Academic Publishers, Dordrecht. 1991. £117.00. ISBN 0 7923 1191 4

A comprehensive review of the current status of organ transplantation. The work is divided into fourteen parts including history, immunology, complication, ethical, legal and religious issues, as well as sections relating to individual organs.

Controversies of Total Knee Arthroplasty edited by Victor M Goldberg. 315 pages, illustrated. Raven Press, New York. 1991. \$119.00. ISBN 0 88167 804 X

The papers presented at a meeting held in Arizona in November 1989. Thirty presentations, each well illustrated and referenced.